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[57]申請專利範圍：

1.一種吸收性物件，供鄰接使用者身體之會陰區穿用，具有一主體部份、一縱長方向、一橫方向、及一x-y平面，吸收性物件包括：
一滲透液體頂片；
連接於頂片之一不滲透液體背片；
位於頂片與背片間之一吸收心體；及
位於頂片上之一身體接觸膠黏劑，以便吸收物件直接附著於穿用者皮膚；
其中吸收物件之主體部份之至少一部份在x-y平面中可依至少一方向伸縮。

2.根據申請專利範圍第1項之吸收物件，其中該主體部份可依縱長方向伸縮。

3.根據申請專利範圍第1項之吸收物件，其中該主體部份可依橫向伸縮。

4.根據申請專利範圍第1項之吸收物件，其中該主體部份可依縱長方向及橫方向伸縮。

5.根據申請專利範圍第1項之吸收物件，其中該主體部份可依x-y平面中之全部各方向伸縮。

6.根據申請專利範圍第1，2，3，4或5項之吸收物件，其中該主體部份可彈性拉伸。

7.根據申請專利範圍第6項之吸收物件，其中該膠黏劑裝置為彈性體式。

8.根據申請專利範圍第6項之吸收物件，其中該等頂片，背片及吸收心體均可彈性拉伸。

9.一種衛生棉，供鄰接穿用者身體之會陰區穿用，衛生棉具有一主體部份及一x-y平面，衛生棉包括：
一滲透液體頂片；
連接於頂片之一不滲透液體背片，及位於頂片與背片間之一吸收心體；及
配置於頂片之膠黏劑裝置，以直接黏附衛生棉於穿用者身體；
其中衛生棉之主體部份可依x-y平面中全部各方向彈性拉伸；及
衛生棉之主體部份能在約100公克力延

伸約3%，及在約200公克力延伸約7.5%。

10.一種吸收性物件，供鄰接使用者身體穿用，具有一主體部份、一吸收流體表面、及一x-y平面，吸收性物件包括：

一不滲透流體背片；

連接於背片之一吸收心體；及

吸收心體上之一身體接觸膠黏劑，以容許吸收物件直接黏附於穿用者皮膚；

其中吸收物件之至少一部份流體吸收表面能響應使用者自站立至蹲下位置之移動而依x-y平面中至少一方向延伸。

11.根據申請專利範圍第10項之吸收物

件，吸收性物件能彈性響應使用者自站立至蹲下位置之運動。

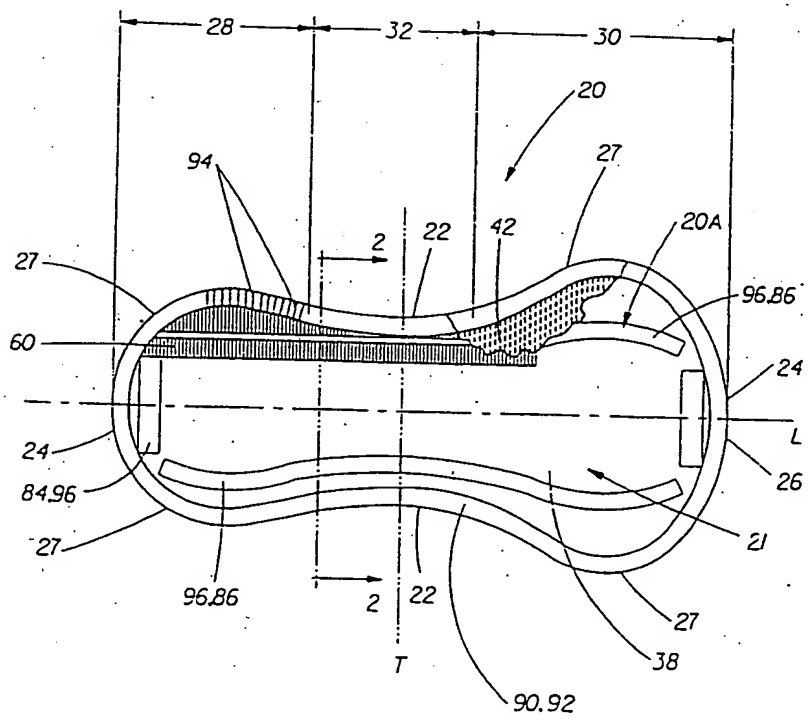
圖式簡單說明：

第一圖為本發明之衛生棉之較佳具體實例之頂視平面圖，顯示無釋出紙覆蓋頂片上膠黏劑。

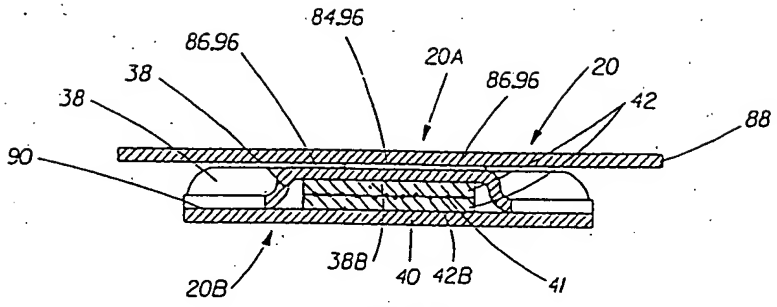
第二圖為沿第一圖所示衛生棉之線2-2所取之斷面圖。

第三圖為簡化平面圖，顯示具有伸縮構件之較傳統形狀之衛生棉之伸縮性。

第四圖為底視平面圖，顯示使用前覆蓋頂片上膠黏劑之釋出紙。



第一圖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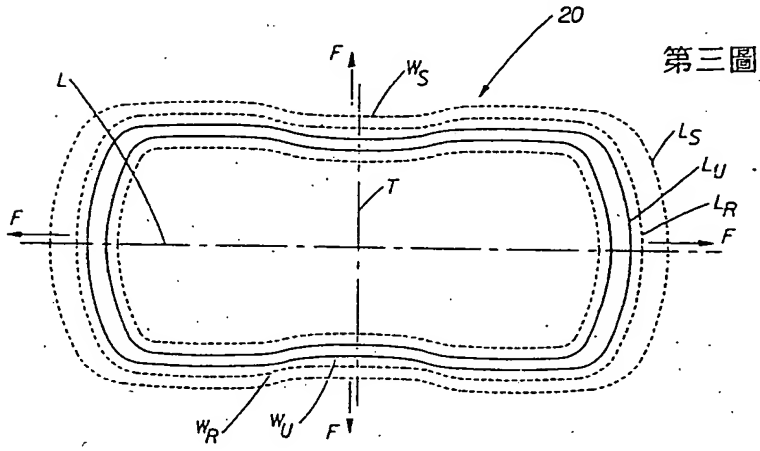
90
388
40
42B
41
20B

第二圖


20
F
W_S
L
L_S
L_U
T
L_R
F
F
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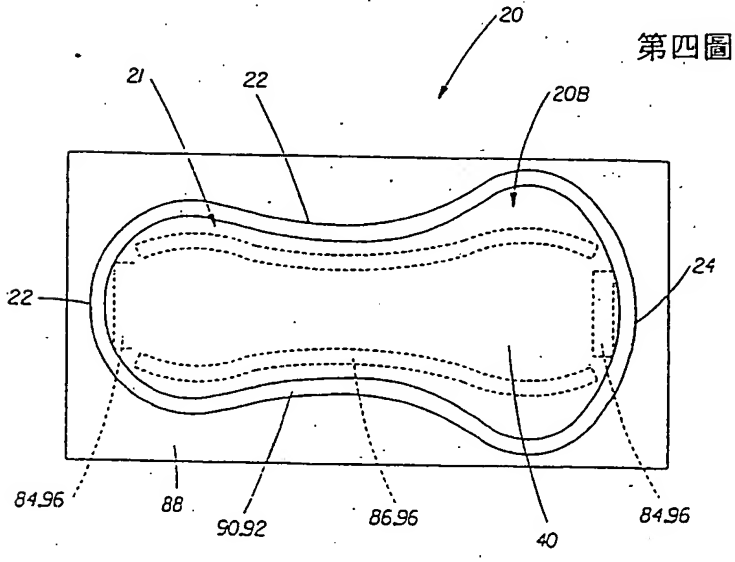
F

第三圖


20
21
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第四圖

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ABSTRACT OF THE DISCLOSURE

Absorbent articles such as sanitary napkins, pantiliners, and incontinence pads are disclosed. This development relates to sanitary napkins and other disposable absorbent articles which have an extensible main body portion and which are designed to be adhered directly to the pudendal region of the body of the wearer. This development is directed to extensible disposable absorbent articles which may be directly adhered to the body of the wearer without the use of longitudinal end tabs or side edge tabs. A sanitary napkin of the present invention may contain at least some elastically stretchable components providing the sanitary napkin with an overall elastic stretchability during wear. Additionally, the topsheet, backsheet, and absorbent core may all be elastically stretchable. The absorbent article is provided with a body contacting adhesive to yield an extensible, body adhering absorbent article. An elastically stretchable sanitary napkin of the present invention may be provided with an elastomeric body adhesive.

EXTENSIBLE SELF-ADHERING ABSORBENT ARTICLE

FIELD OF INVENTION

The present invention relates generally to absorbent articles such as sanitary napkins, pantiliners, and incontinence pads. More particularly, the present invention relates to sanitary napkins which have an extensible main body portion and which are designed to be adhered directly to the body of the wearer.

BACKGROUND OF THE INVENTION

Absorbent articles such as sanitary napkins, pantiliners, and incontinence pads are devices that are typically worn in the crotch region of an undergarment. These devices are designed to absorb and retain liquid and other discharges from the human body and to prevent body and clothing soiling. Sanitary napkins are a type of absorbent article worn by women in a pair of panties that is normally positioned between the wearer's legs, adjacent to the perineal area of the body.

Most of the currently marketed disposable absorbent articles of the types mentioned above are secured by attaching the article to the wearer's undergarment by a pressure sensitive adhesive. Typically, these disposable absorbent articles are also made of materials that will not stretch. That is, the materials and the article itself will not stretch under the forces that the absorbent article is normally subjected to when worn. Recently, however, efforts have been directed toward providing extensible absorbent articles for improved comfort and conformity with the wearer's body and undergarments. Additionally, efforts have also been directed toward development of a disposable absorbent article such as a sanitary napkin which may be directly adhered to the body of a wearer rather than the crotch region of the wearer's undergarment. These efforts have progressed largely independent of one another, and have not combined the advantages of both developments.

U.S. Patent 4,596,570 issued to Jackson, et al. discloses a sanitary napkin with pleated tabs at its longitudinal edges. The pleats of the tabs may be extended to elongate the sanitary napkin and the tabs are provided with a body adhesive to adhere the sanitary

napkin directly to the user's skin. While the tabs of the sanitary napkin described in this patent may be adhered to the body and are extensible, the main body portion of the sanitary napkin is not extensible. This results in reduced comfort because the majority of the portion of the sanitary napkin which will contact the user's body is comprised of materials which will not stretch.

U.S. Patent 4,753,648 issued to Jackson discloses a sanitary napkin with longitudinally elastic end members. These end members are provided with body adhesive. U.S. Patent 5,445,627 issued to Mizutani, et al. discloses a sanitary napkin with a pair of elastically stretchable flaps attached to side edges of the main body portion of the napkin. These stretchable flaps are provided with a body adhesive so that they may be fastened directly to the wearer's skin. While the Jackson '648 and the Mizutani patents do describe sanitary napkins having elastically stretchable fastening tabs, they do not provide a sanitary napkin with an elastically stretchable or extensible main body portion which may be directly adhered to the body of the user. Therefore, these patents also suffer from the same drawbacks discussed above.

A need, therefore, exists for an disposable absorbent article with an extensible main body portion which may be directly adhered to the body of a wearer. A sanitary napkin with an extensible main body portion will better accommodate the body movements of the wearer and provide improved comfort and fit when attached to the wearer's skin. Extensibility of the absorbent article's main body portion, as opposed to only end or side tabs, provides an improved response to wearer movement. Additionally, by eliminating the need for stretchable end or side tabs for attachment, the article of the present invention may be more compact thus providing more wearer comfort and lower wearing awareness.

It is, therefore, an object of the present invention to provide a disposable absorbent article with an extensible main body portion which may be directly adhered to the body of the wearer.

It is a further object of the present invention to provide an extensible disposable absorbent article which may be directly adhered to the body without the use of longitudinal end tabs or side edge tabs.

These and other objects of the present invention will be more readily apparent when considered in reference to the following description and when taken in conjunction with the accompanying drawings.

SUMMARY OF THE INVENTION

The present invention provides an absorbent article, such as a sanitary napkin, pantiliner, or incontinence pad. More particularly, the present invention relates to sanitary napkins which are provided with extensible, and preferably elastically stretchable, main body portions and which are provided with mechanisms to adhere the sanitary napkin directly to the body of the wearer.

The sanitary napkin comprises a liquid impervious backsheet, an absorbent core joined to the topsheet, a body adhesive for attaching the sanitary napkin directly to the body of the wearer. Preferably, the sanitary napkin also comprises a liquid pervious topsheet joined to said backsheet wherein the absorbent core is disposed between the topsheet and backsheet and the body adhesive is disposed on the body contacting surface of the topsheet. The sanitary napkin also comprises at least some extensible components such that the sanitary napkin has an overall extensibility during wear. Preferably, the sanitary napkin also comprises at least some elastically stretchable components such that the sanitary napkin has an overall elastic stretchability during wear. In a particularly preferred embodiment, the topsheet, backsheet, and absorbent core are all elastically stretchable, or at least comprise some elastically stretchable regions that are provided with elastic stretchability without the use of elastic strands, particularly along the longitudinal edges of the sanitary napkin.

The main body portion components of the sanitary napkin (that is, the topsheet, backsheet, and absorbent core) can be comprised of a variety of different materials. In a particularly preferred embodiment, the topsheet comprises an apertured plastic film that has been subjected to a process that provides it with elastic-like properties without attaching elastic strands to the film, i.e., that forms a structured elastic film (referred to herein as "SELF" or a SELFing process). The backsheet comprises an impervious SELFed film. The absorbent core preferably comprises a laminate of absorbent gelling material between two tissues that is at least partially slit for extensibility. The components of the sanitary napkin are preferably assembled in a "sandwich" construction with the topsheet and backsheet forming the perimeter of the sanitary napkin. The topsheet and backsheet are sealed together with a perimeter seal.

The sanitary napkin is also provided with a body adhesive which preferably comprises an elastomeric, non-irritating, adhesive disposed on the body contacting

surface of the sanitary napkin. The adhesive material will preferably stick to skin, but not to body hair, and not leave a residue on the wearer's skin when removed. The preferably elastomeric nature of the adhesive permits the sanitary napkin to extend so as to conform to the wearer's body movements in use.

The sanitary napkin thus formed is preferably very thin, elastically stretchable, soft, and highly drapeable so that it is more cloth-like and less plastic-like (like many current sanitary napkins). The main body portion of the napkin extends with the movements of the wearer's body and provides sustained coverage of the perineal area of the wearer's body.

BRIEF DESCRIPTION OF THE DRAWINGS

While the Specification concludes with claims particularly pointing out and distinctly claiming the present invention, the invention will be better understood from the following description taken in conjunction with the accompanying drawings in which like designations are used to designate substantially identical elements, and in which:

FIG. 1 is a top plan view of a preferred embodiment of the sanitary napkin present invention shown without release paper covering the adhesive on the topsheet.

FIG. 2 is a sectional view taken along line 2-2 of the sanitary napkin shown in FIG. 1.

FIG. 3 is a simplified plan view showing extensibility of a sanitary napkin of a more conventional shape which has extensible components.

FIG. 4. is a bottom plan view showing release paper covering the adhesive on the topsheet prior to use.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to absorbent articles which have an extensible main body portion and which are provided with mechanisms to adhere the absorbent article directly to the body of the wearer.

The term "absorbent article," as used herein, refers to articles which absorb and contain body exudates. More specifically, the term refers to articles which are placed against or in proximity to the body of the wearer to absorb and contain the various exudates discharged from the body. The term "absorbent article" is intended to include sanitary napkins, pantiliners, and incontinence pads (and other articles worn adjacent to the perineal area of the body). The term "disposable" refers to articles which are intended to be discarded after a single use and preferably recycled, composted, or otherwise disposed of in an environmentally compatible manner. That is, they are not intended to be laundered or otherwise restored or reused as an absorbent article.

FIGS. 1-4 show a preferred embodiment of a disposable absorbent article of the present invention. In the preferred embodiment illustrated, the absorbent article is a sanitary napkin designated 20.

The term "sanitary napkin," as used herein, refers to an article which is worn by females adjacent to the pudendal region that is intended to absorb and contain the various exudates which are discharged from the body (e.g., blood, menses, and urine). It should be understood, however, that the present invention is also applicable to other feminine hygiene or catamenial pads such as panty liners, or other absorbent articles such as incontinence pads, and the like.

The sanitary napkin has two surfaces, a liquid pervious body-contacting surface or "body surface" 20A and a liquid impervious garment surface 20B. The sanitary napkin 20 is shown in FIG. 1 as viewed from its body surface 20A. The body surface 20A is intended to be worn adjacent to the body of the wearer and to be adhered directly to the same. The garment surface 20B of the sanitary napkin 20 (shown in FIG. 2) is on the opposite side and is intended to be placed adjacent to the wearer's undergarments when the sanitary napkin 20 is worn.

The sanitary napkin 20 has two centerlines, a principal longitudinal centerline L and a principal transverse centerline T. The term "longitudinal," as used herein, refers to a line, axis, or direction in the plane of the sanitary napkin 20 that is generally aligned with (i.e. approximately parallel to) a vertical plane which bisects a standing wearer into left and right body halves when the sanitary napkin 20 is worn. The terms "transverse" or "lateral," used herein, are interchangeable and refer to a line, axis, or direction generally perpendicular to the longitudinal direction. The sanitary napkin 20 has a longitudinal dimension that runs in the general direction of the principal longitudinal

centerline L, and a (typically shorter) transverse dimension that runs in the general direction of the principal transverse centerline T.

FIG. 1 shows that the sanitary napkin 20 has a main body portion 21 with two spaced apart longitudinal edges 22, two spaced apart transverse or end edges (or "ends") 24, and four corners 27, which together form the periphery 26 surrounding the main body portion 21 of the sanitary napkin 20. The main body portion 21 also has two end regions, which are designated first end region 28 and second end region 30. A central region 32 is disposed between the end regions 28 and 30. The end regions 28 and 30 extend outwardly from the edges of the central region 32 about 1/8 to 1/3 of the length of the main body portion. A detailed description of a central region and two end regions for a sanitary napkin is contained in U.S. Patent 4,690,680 issued to Higgins on September 1, 1987.

The sanitary napkin 20 (or main body portion thereof) can be of any thickness, including relatively thick, intermediate thickness, relatively thin, or even very thin. The preferred embodiment of the sanitary napkin 20 shown in FIGS. 1-3 of the drawings is intended to be an example of a relatively thin sanitary napkin (having a caliper of less than or equal to about 5 mm, more preferably less than or equal to about 4 mm), and preferably is an "ultra-thin" sanitary napkin. It should be understood, however, when viewing these figures the number of layers of material shown causes the sanitary napkin 20 to appear much thicker than it actually is. An "ultra-thin" sanitary napkin 20 as described in U.S. Patents 4,950,264 and 5,009,653 issued to Osborn preferably has a caliper of less than about 3 millimeters. The thin sanitary napkin 20 shown should also be preferably relatively flexible, so that it is comfortable for the wearer.

FIG. 2 shows the individual components of the sanitary napkin 20 of the present invention. The sanitary napkin shown in FIG. 2 generally comprises at least a a liquid impervious backsheet 40, an absorbent core 42, and preferably also a liquid pervious topsheet 38. The absorbent core 42 is positioned between the topsheet 38 and the backsheet 40, or on the body contacting side of the backsheet 40 if a topsheet 38 is not used.

The components of the sanitary napkin 20 may comprise suitable materials described in the patents incorporated by reference herein. The sanitary napkin 20 is comprised of one or more extensible, and preferably elastically stretchable, components and, most preferably, is comprised of all elastically stretchable components. The resulting sanitary napkin 20 should have an overall extensibility, and preferably also has

an overall elastic stretchability. Suitable extensible materials for the components of the sanitary napkin 20 are described in U.S. Patent 5,611,790 issued to Osborn, III et al. on March 18, 1997, and U.S. Patent Application Serial No. 08/192,240 filed February 4, 1994 in the name of Osborn, et al. (PCT Publication No. WO 95/20931). The extensibility and stretchability characteristics of the sanitary napkin 20 of the present invention will now be discussed in greater detail.

The extensibility of the sanitary napkin 20 is shown in a simplified fashion in FIG. 3. The term "extensible," as used herein refers to articles that can increase in at least one of their dimensions in the x-y plane. The x-y plane is a plane generally parallel to the faces of the sanitary napkin 20. The term "extensible" includes articles that are stretchable and elastically stretchable (defined below). The sanitary napkin 20 shown in FIGS. 1-3 is preferably extensible both in length and width. In its most preferred embodiments, the sanitary napkin is extensible in all directions in the x-y plane. The sanitary napkin 20, in other embodiments, however, may be extensible in one of these directions, or extensible in some direction between the longitudinal and transverse directions. Preferably, the sanitary napkin 20 is extensible at least in the longitudinal direction.

The sanitary napkin 20 in addition to being extensible is also preferably elastically stretchable. The term "stretchable," as used herein, refers to articles that are extensible when stretching forces are applied to the article and offer some resistance to stretching. The terms "elastically stretchable" and "elastically extensible" are intended to be synonymous. These terms, as used herein, mean that when the stretching forces are removed, the sanitary napkin will tend to return toward its unextended or unstretched (or "original" dimensions). The sanitary napkin 20 need not return all the way to its unstretched dimensions, however. It may, as shown in FIG. 3 return to relaxed dimensions (such as L_R and W_R) between its unstretched dimensions and extended (or stretched) dimensions L_S and W_S. Making the main body portion of the sanitary napkin elastically stretchable will reduce the undesirable tendency of the sanitary napkin to gather longitudinally inward as a result of the wearer's body movements thereby providing a more comfortable article capable of maintaining good body contact throughout a wide range of wearer movement. Because the main body portion of the sanitary napkin 20 is provided with an overall extensibility, the sanitary napkin 20 of the present invention provides an improved ability for each portion of the sanitary napkin 20 to respond to localized movements of the wearer's body with a reduced tendency to chafe or irritate the wearer's skin.

The preferred sanitary napkin 20 embodiment shown in FIGS. 1-4 is preferably extensible in the amounts described in previously discussed U.S. Patent 5,611,790, and U.S. Patent Application Serial No. 08/192,240 (PCT Publication No. WO 95/20931). To summarize the same, the sanitary napkin 20 is preferably capable of extending about 5% to less than about 50%, more preferably between about 10% and about 40% under the forces associated with wearing the sanitary napkin directly adhered to the body. Preferably, the sanitary napkin is capable of such extension under forces of between about 50 to 100 grams to about 1,000-1,500 grams, more preferably under forces of between about 250 grams and about 800 grams. The sanitary napkin 20 of the present invention can also be provided with any other features of the sanitary napkins described in the above publications including, a structure that provides a "force wall" to prevent elongation past a certain amount without substantial increases in the amount of force applied to the sanitary napkin.

In addition, in some especially preferred embodiments described in greater detail herein, various components of the sanitary napkin 20 are capable of smaller amounts of extension under forces at the low end of the broadest range set forth above (e.g., forces in the range of about 100 - 200 grams). For instance, in such embodiments, the sanitary napkin 20 is preferably capable of extending about 2.5%, more preferably about 3% at 100 grams of force, and about 5%, more preferably about 7.5% at 200 grams force. In absorbent articles with small amounts of extensibility under low forces, the force wall may also occur at low elongations, such as about 5% elongation, but may occur at elongations up to about 50% elongation.

The sanitary napkin 20 is preferably extensible in an amount sufficient to accommodate the full range of movement expected by the wearer's body. Such extensibility is also preferably demonstrated under the same forces as those typically exerted on the sanitary napkin by the wearer's body. A sanitary napkin 20 of the present invention could be constructed to be extensible in at least the same amounts and under the same forces as the wearer's panties (or other undergarments). The wearer's panties may provide a useful benchmark for achieving the desired extensibility of the sanitary napkin 20 because panties are typically designed to accommodate the wearer's body movements and the forces exerted on them by the wearer's body. For example, if the undergarment requires a force to extend about 5% (or about 10%), the sanitary napkin (that is, the main body portion thereof) preferably requires a force to extend the same amount that is less than or equal to about 1.2 times, more preferably less than or equal to about 1 times the force required to extend the undergarment. The force required to

extend the crotch region of a typical North American-type woman's panty in the transverse direction (at the narrowest point of the same) is about 135 g/cm. The force required to extend the portions of the back panel of such a panty where the second end region of the sanitary napkin might lie in the longitudinal direction is about 165 g/cm. A typical force to elongate the panty elastics of a North American cotton panty is about 135 g/cm. Elastic forces for other types of panties or undergarments may be somewhat higher.

The individual components which may be suitable for the various embodiments of the sanitary napkin 20 of the present invention will now be looked at in greater detail with reference to FIGS. 1-4.

In preferred embodiments, the topsheet 38 comprises a first liquid pervious component. When the sanitary napkin 20 is in use, the topsheet 38 is adhered directly to the skin of the user. The topsheet 38 used in the embodiment shown in FIGS. 1-3 is preferably elastically extensible, and is as compliant, soft feeling, and non-irritating to the user's skin as possible. The topsheet 38 should further exhibit good strikethrough and a reduced tendency to rewet permitting bodily discharges to rapidly penetrate it and flow toward the core 42, but not allowing such discharges to flow back through the topsheet 38 to the skin of the wearer.

A suitable topsheet 38 may be manufactured from a wide range of materials including, but not limited to woven and nonwoven materials, apertured formed thermoplastic films, apertured plastic films, and thermoplastic scrims. Suitable woven and nonwoven materials can be comprised of natural fibers (e.g., wood or cotton fibers), synthetic or modified natural fibers (e.g., polymeric fibers, such as polyester, polypropylene fibers, and polyethylene, or polyvinylalcohol, starch base resins, polyurethanes, cellulose esters, nylon, and rayon fibers) or from a combination of natural and synthetic fibers. When the topsheet 38 comprises a nonwoven web, the web may be spunbonded, carded, wet-laid, meltblown, hydrogentangled, combinations of the above, or the like.

Apertured films are generally preferred for the topsheet 38 because they are pervious to liquids and, if properly apertured, have a reduced tendency to allow liquids to pass back through and rewet the wearer's skin. Suitable apertured films are described in U.S. Patent 3,929,135 issued to Thompson on December 30, 1975; U.S. Patent 4,324,426 issued to Mullane, et al. on April 13, 1982; U.S. Patent 4,342,314 issued to Radel, et al. on August 3, 1982; U.S. Patent 4,463,045 issued to Ahr, et al. on July 31, 1984; and U.S.

Patent 5,006,394 issued to Baird on April 9, 1991. A particularly suitable topsheet 38 is made in accordance with U.S. Patent 4,342,314 issued to Radel, et al. and U.S. Patent 4,463,045 issued to Ahr, et al. A topsheet 38 made of model X-3265 or model P1552 apertured formed film sold by Tredegar Corporation of Terre Haute, Indiana has been found to work well.

The topsheet 38 can be made extensible by performing a mechanical operation, such as pleating, corrugating, or ring rolling on the topsheet material to provide folds in the topsheet 38 that are able to open when the topsheet 38 is stretched. The term "ring rolling," as used herein, refers to a process of feeding the topsheet material between a pair of internally corrugated rolls. Such processes can be performed on many of the topsheet materials described above. In one preferred embodiment of the present invention, the topsheet 38 is made in accordance with U.S. Patent 4,463,045 and ring rolled to provide it with a degree of longitudinal extensibility. Such a topsheet is described in U.S. Patent 5,366,782 issued to Curro, et al. on November 22, 1994. Suitable processes for ring rolling or "pre-corrugating" are described are described in U.S. Patent 4,107,364 issued to Sisson on August 15, 1978; U.S. Patent 4,834,741 issued to Sabee on May 30, 1989; U.S. Patent 5,167,897 issued to Weber, et al. December 1, 1992; U.S. Patent 5,156,793 issued to Buell, et al. October 20, 1992; and U.S. Patent 5,143,679 issued to Weber, et al. September 1, 1992. The fold lines in the corrugations of a ring rolled topsheet are preferably oriented in the transverse direction so the topsheet is longitudinally extensible. In other embodiments, the fold lines could run in the longitudinal direction, both the longitudinal and transverse directions, and/or other directions. The topsheet 38 will be extensible in directions perpendicular to the fold lines.

In the particularly preferred embodiments shown in FIGS. 1-3 the topsheet 38 comprises an apertured film, such as that described in U.S. Patent 4,463,045, that is provided with a strainable network so that the topsheet 38 exhibits elastic-like behavior without added elastic materials. A web material with such a strainable network may be referred to herein as a "strainable apertured web material" or, for brevity as a "strainable web material" or simply as the "web material." This type of material is also referred to herein as a structural elastic-like film or "SELF" material. A suitable strainable apertured web material is described in U.S. Patent 5,518,801 issued to Chappell, et al. May 21, 1996. A portion of the topsheet 38 shown in FIG. 1 is shown as a strainable web material 60 (SELFed material). The remainder of the topsheet 38 is not shown as SELFed in order to more clearly show other features of the sanitary napkin 20.

In preferred embodiments, the topsheet 38 is rendered hydrophllic so that liquids will transfer through the topsheet 38 faster. This will diminish the likelihood that body exudates will flow off the topsheet rather than being drawn through the topsheet 38 and being absorbed by the absorbent core 42. The topsheet 38 can be rendered hydrophilic by treating it with surfactants. Suitable methods of applying surfactants are described in U.S. Patents 4,950,254 and 5,009,653 issued to Osborn (which include incorporating the surfactant into the polymeric material of a formed film topsheet) as well as treating the surface of the component underlying the topsheet with a surfactant.

In addition, in preferred embodiments, the inner surface 38B of topsheet 38 is secured in contacting relation with an underlying absorbent layer. This contacting relationship results in liquid penetrating topsheet 38 faster. The topsheet 38 may be kept in a contacting relationship with an underlying layer by bonding the topsheet to the underlying layer. However, it is not absolutely necessary to bond the face of the topsheet 38 to the face of the underlying layer. The topsheet 38 can be maintained in contact with an underlying absorbent component, by entangling the fibers of the underlying layer with the topsheet, by fusing the topsheet 38 to an underlying absorbent layer by a plurality of discrete individual fusion bonds, or by any means known in the art.

The absorbent core 42 is positioned between the topsheet 38 and the backsheet 40. The absorbent core 42 provides the means for absorbing exudates such as menses and other body fluids. The absorbent core 42 need not have an absorbent capacity much greater than the total amount of body fluids anticipated to be absorbed. The absorbent core 42 preferably is generally compressible, conformable, and non-irritating to the user's skin.

In the embodiments shown in FIGS. 1-4, the absorbent core 42 is preferably elastically extensible. The absorbent core 42, however, need not be extensible in all embodiments to provide a benefit. For example, a relatively inextensible core can be used in an embodiment in which the topsheet together with an underlying absorbent component (or integral absorbent component) is extensible and the topsheet and such absorbent component are not attached to the face of the core so that they are able to separate from (or "decouple" from) the core. The concept of decoupling (in general) is described in U.S. Patent 5,007,906 issued to Osborn on April 16, 1991. Such an embodiment is useful if the topsheet 38 is capable of extending independently of the absorbent core 42 and any other underlying components which are relatively inextensible.

The absorbent core 42 can comprise any material used in the art for such purpose including natural materials and synthetic materials. Non-limiting examples of such materials include natural materials such as comminuted wood pulp (which is generally referred to as airfelt), creped cellulose wadding, hydrogel-forming polymer gelling agents, creped tissues or creped nonwovens containing fibers comprised of absorbent or superabsorbent polymers, modified cross-linked cellulose fibers (such as those described in U.S. Patent 5,217,445 issued to Young, et al. on June 8, 1993), capillary channel fibers (that is, fibers having intra-fiber capillary channels such as those described in U.S. Patent 5,200,248 issued to Thompson, et al. on April 6, 1993), absorbent foams (such as those described in U.S. Patent 5,268,224 issued to DesMarais, et al. on December 7, 1993), thermally bonded airlaid materials (such as those materials described in U.S. Patent 5,607,414 issued to Richards et al. on March 4, 1997), absorbent sponges, synthetic staple fibers, polymeric fibers, peat moss, or any equivalent material or combinations of materials.

The polymeric gelling agents listed above may also be referred to as "absorbent gelling materials" ("AGM"), or "superabsorbent materials." Polymeric gelling agents are those materials which, upon contact with liquids such as water or other body liquids, imbibe such liquids and thereby form hydrogels. In this manner, liquids discharged into the absorbent core 42 can be acquired and held by the polymeric gelling agent, thereby providing the articles herein with enhanced absorbent capacity and/or improved liquid retention performance. The polymeric gelling agent which is employed in the absorbent core 42 will generally comprise particles of a substantially water-insoluble, slightly cross-linked, partially neutralized, hydrogel-forming polymer material. The polymeric gelling agent can be in many forms, including in the form of particles, flakes or fibers.

In one preferred embodiment, the absorbent core 42 is a laminate. The laminate is comprised of a layer of superabsorbent polymer material, such as in the form of particles 41, disposed between two air-laid tissues, first and second tissue layers. the first and second tissue layers provide containment of the superabsorbent polymer material, improve lateral wicking of the absorbed exudates throughout the absorbent core 42 and provide a degree of absorbency. The tissue layers can be comprised of a single tissue web which is folded with the superabsorbent material particles 41 between, or two separate sheets of the same (or different) tissue.

A suitable laminate is a superabsorbent laminate known as WATER-LOCK L-535 available from the Grain Processing Corporation of Muscatine, Iowa (WATER-

LOCK registered TM by Grain Processing Corporation). Such superabsorbent laminates are disclosed in U.S. Patent 4,467,012 issued to Pedersen, et at. on August 21, 1984; U.S. Patent 4,260,443 issue to Lindsay, et al. on April 7, 1981; U.S. Patent 4,578,068 issued to Kramer, et al. on March 25, 1986; and U.S. Patent 5,460,623 issued to Emenaker, et al. on October 24, 1995.

The absorbent core materials described above can be made extensible in many different ways, including by cutting or slitting the same. FIG. 1 shows an embodiment in which the topsheet 38 is partially cut away and the absorbent core 42 is a laminate as described above which is slitted or partially slitted with transverse slits for longitudinal extensibility.

The backsheet 40 prevents the exudates absorbed and contained in the absorbent core 42 from wetting articles which contact the sanitary napkin 20 such as pants, pajamas and undergarments. The backsheet 40 should be flexible and impervious to liquids (e.g., menses and/or urine).

The backsheet 40 may comprise a woven or nonwoven material, polymeric films such as thermoplastic films of polyethylene or polypropylene, or composite materials such as a film-coated nonwoven material. Preferably, the backsheet 40 is a thin plastic film, such as a polyethylene film having a thickness of from about 0.012 mm (0.5 mil) to about 0.051 mm (2.0 mils). Exemplary polyethylene films are manufactured by Clopay Corporation of Cincinnati, Ohio, under the designation P18-1401 and Tredegar Film Products of Terre Haute, Indiana, under the designation XP-39385.

The backsheet 40 is preferably embossed and/or matte finished to provide a more clothlike appearance. Further, the backsheet 40 may permit vapors to escape from the absorbent core 42 (i.e., the backsheet 40 may be breathable) while still preventing exudates from passing through the backsheet 40. Flushable or biodegradable backsheets can also be used, e.g., such as with the pantiliner devices described herein. Another suitable backsheet material is nonwoven/film laminate described in U.S. Patent 5,007,906 issued to Osborn on April 16, 1991.

The backsheet 40 preferably has the same extensibility, and preferably elastic extensibility, characteristics as the topsheet 38. The backsheet 40 can be made extensible by forming it from an elastomeric film such as the film described in U.S. Patent 4,746,180 issued to Wnuk on October 9, 1984. Such a film is obtained from Exxon Chemical Company of Lake Zurich, Illinois as Exxon film EXX-500 (formerly EXX-7).

Another preferred extensible backsheet 40 is an extensible adhesive film. An adhesive film can be created with one side that has an adhesive tack, and one side without tack. The tack side of the film can be adhered to the garment-facing side 42B of the absorbent core 42. One suitable adhesive film having these characteristics is a composite structure comprising a nonwoven elastomeric film with a low modulus pressure sensitive adhesive, such as adhesive film Formula #198-338 which is available with a blocking film such as Formula H2031 from the Findley Adhesives Company. Such materials are further described (and used for other purposes) in U.S. Patent 5,032,120 issued to Freeland, et al. on July 16, 1991; and U.S. Patent 5,037,416 issued to Allen, et al. on August 6, 1991.

In still other embodiments, the backsheet 40 can be made extensible by performing a mechanical operation, such as pleating, corrugating, ring rolling, or SELFing the backsheet material. In the preferred embodiments shown in FIGS. 1-4 the backsheet 40 is formed by SELFing (as described in U.S. Patent 5,518,801 issued to Chappell, et al. on May 21, 1996) one of the exemplary polymeric films described above. Such a SELFed backsheet material is preferred over many of the elastomeric films described above because of its relatively low cost.

The components of the main body portion described above (topsheet 38, backsheet 40, and absorbent core 42) can be assembled in any suitable manner. In the preferred embodiment shown in FIGS. 1-4, the components of the main body portion are assembled in a "sandwich" configuration with the components sized so that the edges of the topsheet 38 and backsheet 40 extend outward beyond the edges of the absorbent core 42. The topsheet 38 and backsheet 40 are preferably at least partially peripherally joined using known techniques. As shown in FIG. 1, the topsheet 38 is preferably secured to backsheet 40 along a seam, such as seam 90. Seam 90 is preferably liquid impervious. The seam 90 can be formed by any means commonly used in the art for this purpose such as by gluing, crimping, or heat-sealing.

The term "joined," as used herein, encompasses configurations in which an element is directly secured to another element by affixing the element directly to the other element; configurations in which the element in indirectly secured to the other element by affixing the element to intermediate member(s) which in turn are affixed to the other element; and configurations in which one element is integral with the another element, i.e., one element is essentially part of the other element.

The components of the sanitary napkin 20 can be joined together by adhesives, stitching, heat and/or pressure bonds, dynamic mechanical bonds, ultrasonic bonds, intermingling or entanglement of the fibers or other structural elements comprising the components of the sanitary napkin, such as by meltblowing the fibers comprising one components onto another components, extruding one components onto another, or by any other means known in the art. Suitable means for attaching the components of the sanitary napkin are described in U.S. Patent Application Serial No. 07/810,774 filed in the name of Cree, et al. on December 17, 1991 (PCT Patent Publication No. WO 93/11725 published on June 24, 1993).

The components can be joined together in any suitable manner than allows the main body portion to extend. The combining of the topsheet 38 and backsheet 40 in an extensible product cannot always be accomplished by traditional sealing methods or materials used for nonstretchable products. Bonds formed by traditional heat and pressure methods often do not stretch or are embrittled so that they easily rip or tear when the product is stretched. This is particularly a problem when the topsheet 38 and the backsheet 40 have different elastic properties, or melting points, or are sufficiently different in composition that sealing is difficult even when these components do not stretch.

In the particularly preferred elastically extensible sanitary napkin 20 embodiment shown in FIGS. 1-4, the portions of the topsheet 38 and backsheet 40 at the edges of the topsheet 38 and backsheet 40 are secured together using an extensible adhesive 92 around the perimeter 26 of the sanitary napkin and in addition, a preferred distribution of mechanical bonds 94 in the perimeter area 26. The extensible adhesive 92 provides an impervious extensible seal around the perimeter 26 of the sanitary napkin 20. The mechanical bonds 94 (only a portion of which are shown if FIG. 1) provide added strength. The mechanical bonds 94 are arranged in intermittent zones (or regions) of bonded and nonbonded areas.

The sanitary napkin 20 is also provided with adhesive means 96 to adhere the sanitary napkin 20 directly to the body of the wearer. FIG. 1 shows a sample adhesive pattern used to adhere the sanitary napkin 20 of the present invention to the skin of the user. In the sample pattern shown in FIG. 1, the sanitary napkin is provided with two adhesive end patches 84 and perimeter adhesive 86, an adhesive that is disposed around the remainder of the perimeter of the main body portion 21, which are adapted to secure the sanitary napkin 20 to the body of the wearer. Not all of the perimeter adhesive 86 is

shown in FIG. 1 in order to more clearly view other features of the sanitary napkin 20 (e.g. SELFing of the topsheet 38). It should be noted that the pattern shown in FIG. 1 is only a representative sample, the adhesive pattern applied to the body facing side 20A of the sanitary napkin 20 may differ without departing from the scope of the present invention.

The adhesive material 96 which comprises the adhesive end patches 84 and the perimeter adhesive 86 may be selected from any suitable composition known in the art. The adhesive 96 is preferably elastomeric so as to allow the sanitary napkin 20 to stretch as described above in conformance with movements of the body of the wearer. Preferably, the adhesive material 96 is a pressure sensitive, non-irritating, hydrophilic and hypoallergenic adhesive. Ideally, the adhesive material 96 should stick to skin, but not to body hair, and should not leave a residue on the skin when the sanitary napkin 20 is removed from the wearer's body after use. This is accomplished by selecting an adhesive 86 which has a greater adhesion for the body surface 20A of the sanitary napkin 20 than for the skin of the user. The adhesive selected preferably has sufficient tack to hold the sanitary napkin 20 in place during use, but will releasably adhere to human skin such that the sanitary napkin 20 may be comfortably peeled from the skin by the wearer after use.

One non-limiting example of a suitable pressure-sensitive, hydrophilic, elastomeric, hydrogel adhesive material is described in detail in U.S. Patent 4,699,146 issued to Sieverding on October 13, 1987. The disclosure of this patent is hereby incorporated by reference.

In other embodiments, the end fasteners 84 may be inextensible, while the perimeter fasteners 86 are preferably extensible. Alternatively, inextensible end fasteners 84 may be used without any other attachment mechanisms. The end fasteners 84 and perimeter fasteners 86 are preferably releasably covered prior to use of the sanitary napkin 20 by release paper 88 as shown in FIG. 4.

The terms "panty liner" and "pantiliner" refer to absorbent articles that are less bulky than sanitary napkins which are generally worn by women between their menstrual periods. Suitable absorbent articles in the form of pantiliners that could be provided with the stiffening feature described herein are disclosed in U.S. Patent 4,738,676 entitled "Pantiliner" issued to Osborn on April 19, 1988.

The disclosures of all patents, patent applications (and any patents which issue thereon, as well as any corresponding published foreign patent applications), and publications mentioned throughout this patent application are hereby incorporated by reference herein. It is expressly not admitted, however, that any of the documents incorporated by reference herein teach or disclose the present invention. It is also expressly not admitted that any of the commercially available materials or products described herein teach or disclose the present invention.

While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention.

WHAT IS CLAIMED IS:

1. An absorbent article for wearing adjacent the pudendal region of the body of a user, said absorbent article having a main body portion, a longitudinal direction, a transverse direction, and an

x-y plane, said absorbent article comprising:

a liquid pervious topsheet,

a liquid impervious backsheet joined to said topsheet,

an absorbent core positioned between said topsheet and said backsheet, and

a body contacting adhesive disposed on said topsheet allowing said absorbent article to be adhered directly to the skin of said user,

wherein at least a portion of said main body portion of said absorbent article is extensible in at least one direction in said x-y plane.

2. The absorbent article of Claim 1 wherein said main body portion of said absorbent article is extensible in said longitudinal direction.

3. The absorbent article of Claim 1 wherein said main body portion of said absorbent article is extensible in said transverse direction.

4. The absorbent article of Claim 1 wherein said main body portion of said absorbent article is extensible in said longitudinal direction and said transverse direction.

5. The absorbent article of Claim 1 wherein said main body portion of said absorbent article is extensible in all directions in said x-y plane.

6. The absorbent article of any of Claims 1-5 wherein said main body portion of said absorbent article is elastically stretchable.

7. The absorbent article of Claim 6 wherein said adhesive means is elastomeric.

8. The absorbent article of Claim 6 wherein each of said topsheet, said backsheet, and said absorbent core, are elastically stretchable.

9. A sanitary napkin for wearing adjacent the pudendal region of the body of a wearer, said sanitary napkin having a main body portion and an x-y plane, said sanitary napkin comprising:

a liquid pervious topsheet,

a liquid impervious backsheet joined to said topsheet, an absorbent core positioned between said topsheet and said backsheet, and

an elastomeric adhesive disposed on said topsheet for adhering said sanitary napkin directly to said body of said wearer,

wherein said main body portion of said sanitary napkin is elastically stretchable in all directions in said x-y plan, and wherein

said main body portion of said sanitary napkin is capable of extending about 3% at about 100 grams of force and about 7.5% about 200 grams of force.

10. An absorbent article for wearing adjacent the body of a user, said absorbent article having a main body portion, a fluid absorbing surface, and an x-y plane, said absorbent article comprising:

a liquid impervious backsheet,

an absorbent core joined to said backsheet, and

a body contacting adhesive disposed on said absorbent core allowing said absorbent article to be adhered directly to the skin of said user,

wherein at least a portion of said fluid absorbing surface of said absorbent article is capable of extending in at least one direction in said x-y plane in response to said user moving from a standing to a squatting position.

11. The absorbent article of Claim 10 which responds elastically to the motion of said wearer moving from a standing to a squatting position.

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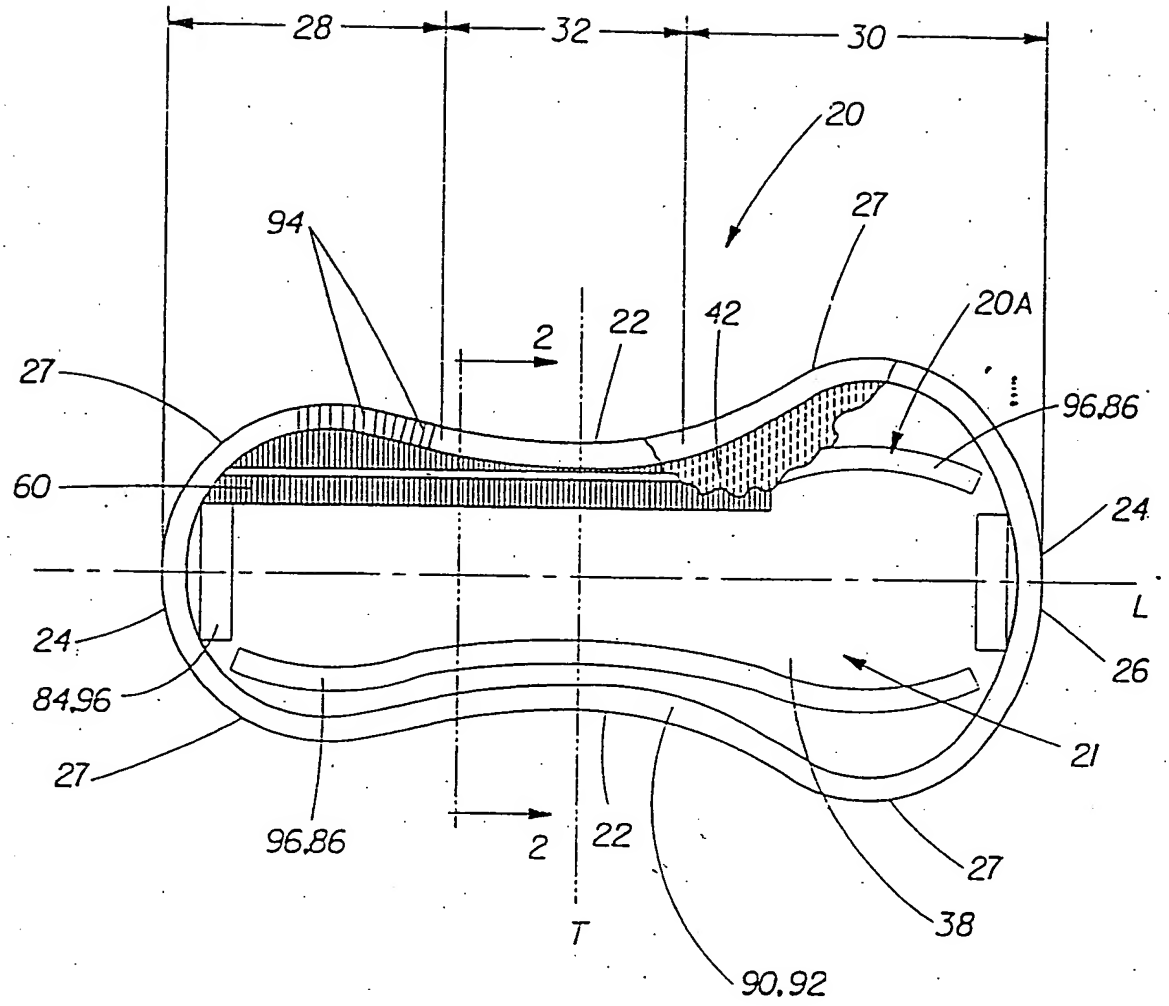

Fig. 1

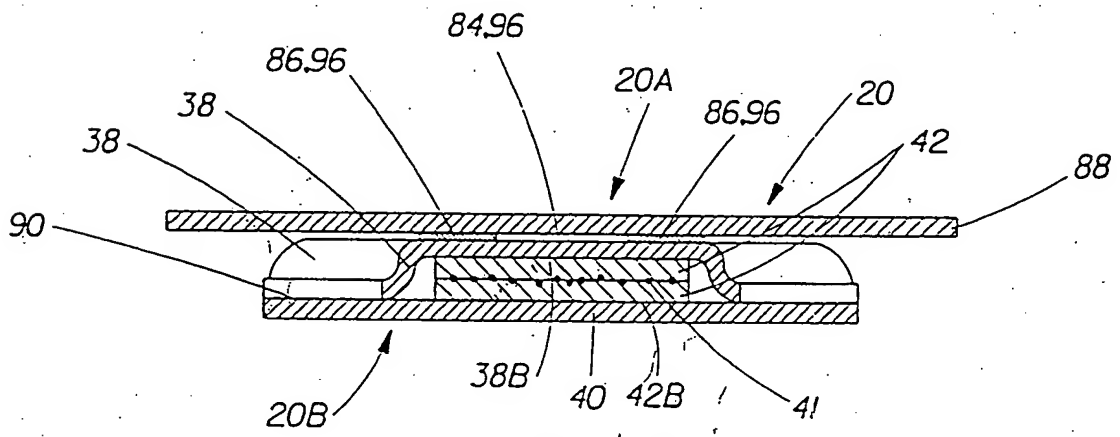

Fig. 2

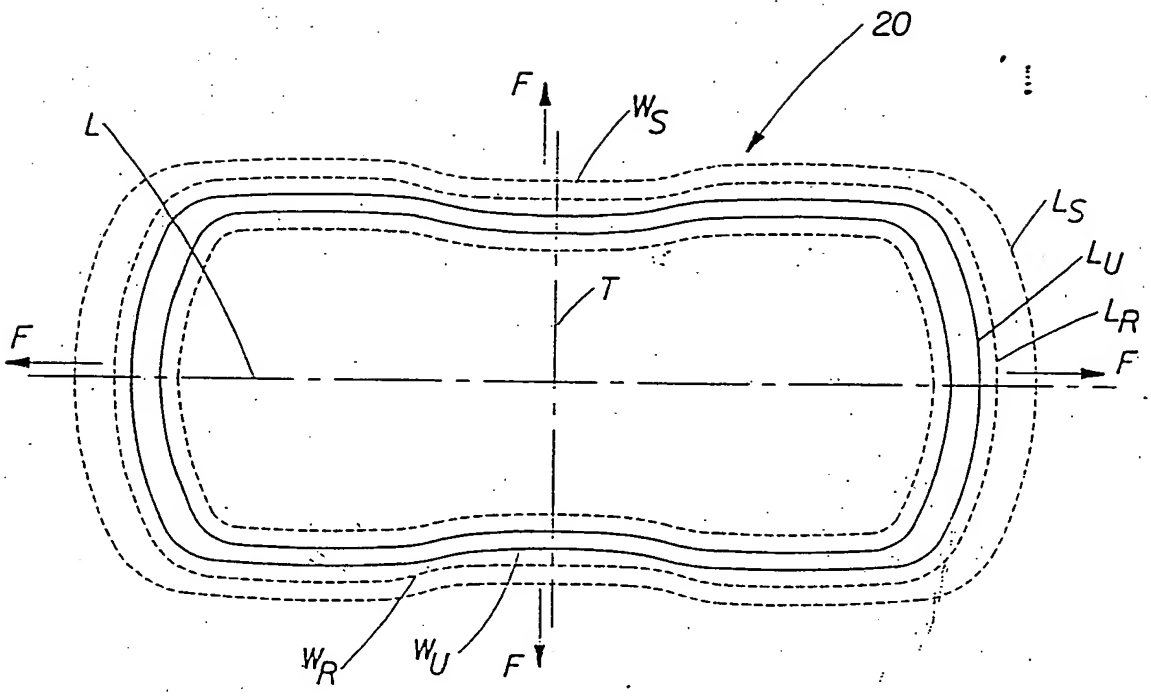

Fig. 3

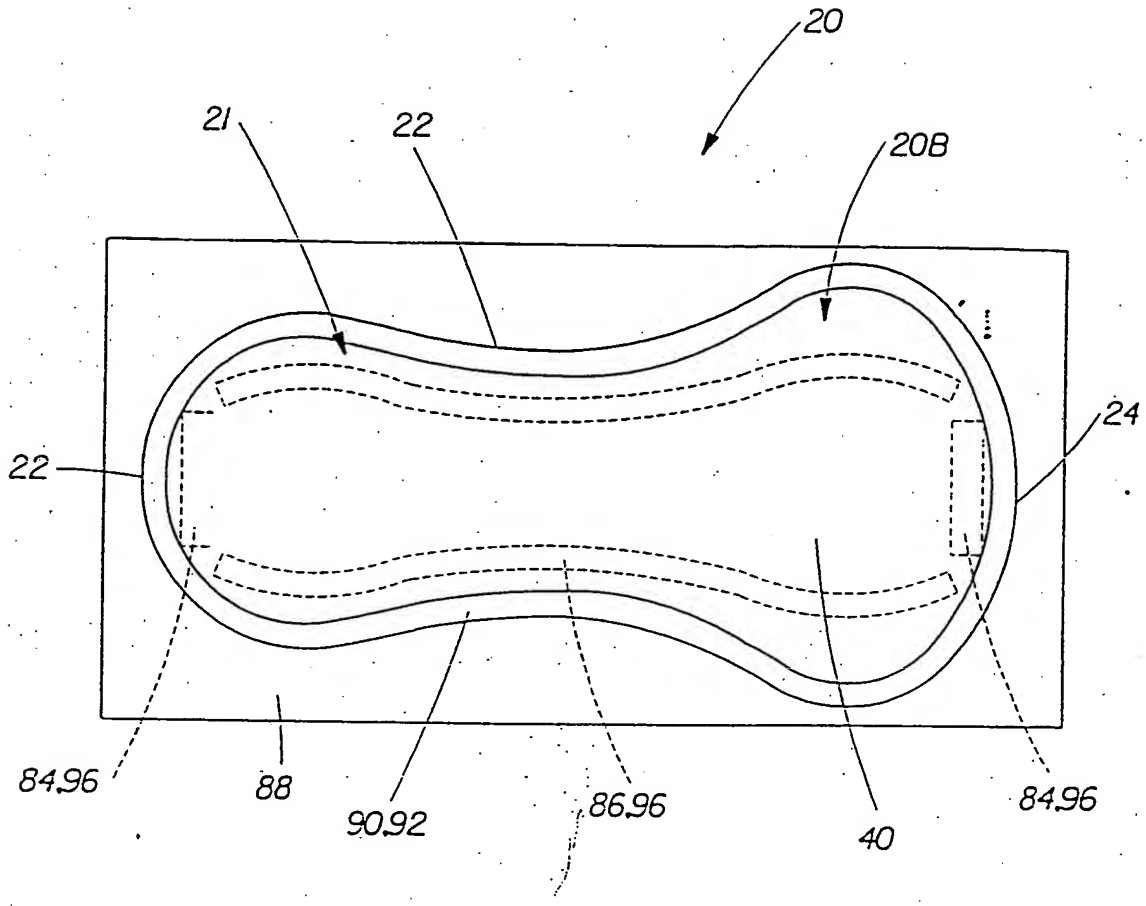

Fig. 4